Unilateral vestibular loss and fluctuating vestibular disorders

Timothy C. Hain, M.D.

**Unilateral disorders**

- Vestibular neuritis
- Meniere’s disease
- Acoustic Neuroma
- Vestibular Paroxysmia

**Vestibular Neuritis: Case**

56 y/o woman began to become dizzy after lunch. Dizziness increased over hours, and consisted of a spinning “merri-go-round” sensation, combined with unsteadiness. Vomiting ensued 2 hours later, and she was brought by family members to the ER.

**Vestibular Neuritis**

- Viral infection of vestibular nerve or ganglion (Herpes).
- Disability typically lasts 2 weeks.
- Typically affects the superior division of 8
- These patients can still get BPPV (inferior division of 8)!

**Menieres Disease**

- GG is a 34 y/o male who developed fluctuating SNHL on the left 3 yrs ago and now has vertiginous spells three times a week that necessitate his leaving work. Work-up has been negative and has been treated with a low salt diet and a diuretic over the past 2 yrs, yet symptoms have progressed. Hearing in the left ear is good (SRT 20, SD 100%) and excellent on the right (SRT 0, SD 100%).

**Meniere’s disease**

- Prosper Meniere 1861
- Disorder of the membranous labyrinth that consists of:
  - Fluctuating SNHL
  - Episodic Vertigo
  - Fluctuating Tinnitus
  - Aural Fullness
**Etiology Dogma**

- Meniere's disease is caused by dilation and episodic rupture of inner ear membranes (Endolymphatic Hydrops).
- As endolymph volume and pressure increases, the utricular/saccular and Reissner's membranes rupture, releasing potassium-rich endolymph into the perilymph causing cochlear/vestibular paralysis.

**Menieres: a common and chronic ear condition**

- 0.2% of US (Wladislavosky et al, 1984).
- 2% THINK they have Menieres (Mosciki, 1985).
- Spontaneous cure is rare.
- 30-50% will become bilateral within 10 years of onset.
- Avg. attack lasts 2-3 hours.

**Diagnosis - clinical**

- Fluctuating SNHL, Vertigo, Tinnitus, Fullness.
- "Cochlear M.D." - SNHL with tinnitus.
- "Vestibular M.D." - Vertigo with fullness (?)
- "Lermoyez Syndrome" - 1919, Increasing tinnitus, SNHL and fullness that is relieved after attack of vertigo.

**Tumarkin Crisis**

- "Crisis of Tumarkin" - 1936, Advanced phenomenon in 2% of pts. Drop attack, no LOC, no vertigo, "abrupt otolith input."

**Gentamicin Treatment**

- Very effective treatment.
- May create a unilateral vestibular loss or paresis.

**Diagnosis - testing**

- **Bedside**
  - During attack: Strong spontaneous nystagmus.
  - Between attack's, weak spontaneous or no spontaneous, minor positional nystagmus.
  - After gentamicin - strong vibration induced nystagmus.

- **Electronystagmography**
  - Not diagnostic - main role is to look for alternative diagnoses such as BPPV or vestibular neuritis/labyrinthitis, which are more common.
  - Variable nystagmus, spontaneous nystagmus is usually "Paretic" (Away from affected ear).
**Acoustic Neuroma**

- Rare source of unilateral loss
- Starts with irritable nerve
- Progresses to dead nerve
- Long course

**Acoustic Neuroma -- Bedside**

- Unilateral hearing loss – not 100%
- Spontaneous nystagmus - gradually is lost over time
- Vibration induced nystagmus - works very nicely!
- Hyperventilation induced nystagmus – see later section
- Head-shaking nystagmus – can be very brief, may miss it.

**Acoustic on ENG**

- Unilateral weakness
- Spontaneous nystagmus

Ultimately dx is made from MRI

**Vestibular Nerve Hyperexcitability**

**Vestibular Neuralgia**

- Microvascular compression

**Vestibular paroxysmia**

- Quick spins

**Case**

A 49-year-old female had had multiple daily brief spells of vertigo. She termed these symptoms a “zap” inside of her head. Her symptoms were not affected by position.  
- Brain MRI, EEG, ENG and audiometry were normal.  
- She had a spell while wearing the video Frenzel goggles. She cried out and her eyes vibrated for 1/3 second.  
- Oxcarbazepine 300 mg TID reduced the frequency and intensity of her symptoms.

**Vestibular nerve hyperexcitability**

- Many brief spinning spells/day
- Respond to anticonvulsants
### Bedside
- Spontaneous nystagmus (usually paretic)
- May reverse with hyperventilation

### Pathophysiology
- Irritable vestibular nerve
  - Previous 8th nerve surgery (delayed)
  - Previous vestibular neuritis (Herpes)
  - Microvascular compression


### ENG findings are nonspecific
- Usually largely normal
- Spontaneous nystagmus

Ultimately diagnosis is made from response to medication

### Bedside testing for unilateral vestibular loss
- Spontaneous Nystagmus
- Vibration
- Head-thrust
- Head-shake
- Hyperventilation
- Positional

### Bedside testing for unilateral vestibular loss
- Spontaneous vibration
- Head-thrust
- Head-shake
- HVT
- Positional

![Spontaneous Nystagmus](image1)

- No vibration
  - VibrationMenieresLeftGentMz.AVI
Bedside testing for unilateral vestibular loss

- Spontaneous
- Vibration
- Head-thrust
- Head-shake
- HVT
- Positional

Bedside testing for unilateral vestibular loss

- Spontaneous
- Vibration
- Head-thrust
- Head-shake
- HVT
- Positional

Many patients have a modest paretic horizontal nystagmus, elicited by positional testing.

- It is never symptomatic and has no diagnostic utility

ENG testing in Unilateral Vestibular lesions

- Spontaneous Nystagmus
- Vibration
- Head-thrust
- Head-shake
- Hyperventilation
- Positional

ENG testing in Unilateral Vestibular lesions

- Spontaneous Nystagmus
- Vibration
- Head-shake
- Caloric testing
- Rotatory Chair
ENG testing in Unilateral Vestibular lesions

Spontaneous
Vibration
Head shake
Caloric testing
Rotary Chair

Caloric diagnostic criteria for UL (Chicago Dizziness and Balance)

<table>
<thead>
<tr>
<th>Normal</th>
<th>U-weak</th>
<th>BL</th>
</tr>
</thead>
<tbody>
<tr>
<td>RVR</td>
<td>Normal</td>
<td>25-100</td>
</tr>
<tr>
<td></td>
<td>&lt;25</td>
<td>Has ice</td>
</tr>
<tr>
<td>Total Resp</td>
<td>&gt; 19</td>
<td>&gt; 19</td>
</tr>
</tbody>
</table>

Rotatory Chair testing can sort patients into 3 groups

- Normal
- Unilateral
- Bilateral

Rotatory Chair criteria for Unilateral Loss

<table>
<thead>
<tr>
<th>Normal</th>
<th>UL</th>
<th>BL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gain</td>
<td>Normal (&gt; 0.7)</td>
<td>Reduced at low freq.</td>
</tr>
<tr>
<td>Phase</td>
<td>Normal, Tc of 15</td>
<td>Lead, Tc of 7-10</td>
</tr>
</tbody>
</table>
## Summary

- There is a large repertoire of tests for Unilateral Vestibular Loss
- Combining these together, it is usually easy to diagnose loss of lateral canal function.